

Docket No.: M4065.0693/P693-A
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

John T. Moore

Divisional of Application No.

09/779,983 filed February 8, 2001

Application No.: To be assigned

Prior Group Art Unit: 2824

Filed: Concurrently Herewith

Prior Examiner: M. Luhrs

For: METHOD OF FORMING NON-
VOLATILE RESISTANCE VARIABLE
DEVICES, METHOD OF PRECLUDING
DIFFUSION OF A METAL INTO
ADJACENT CHALCOGENIDE
MATERIAL, AND NON-VOLATILE
RESISTANCE VARIABLE DEVICE

INFORMATION DISCLOSURE STATEMENT (IDS)

Commissioner for Patents
Washington, DC 20231

Dear Sir:

Pursuant to 37 CFR 1.56, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached PTO/SB/08. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

The references cited in the attached form PTO/SB/08 are not supplied herewith because they were previously cited by or submitted to the Office in U. S.

Patent Application No. 09/779,983, filed February 8, 2001, which is relied upon in this application for an earlier filing date under 35 U.S.C. 120.

Documents discussed in Appendix A marked with an asterisk (*) are indicated to be potentially more relevant than others. Such marking is provided only to assist the Examiner; however, the Examiner is requested to thoroughly review all documents cited herein.

The attention of the Patent and Trademark Office is hereby also directed to pending U.S. Application Serial Nos. 10/077,867, filed February, 2002; 10/230,189, filed August 29, 2002; 10/120,521, filed April 12, 2002; and 09/803,176, filed March 7, 2001. All of these relate to similar subject matter to that described and claimed in the present application. The Examiner is requested to review these applications for any information therein which may be deemed material to the present application.

In accordance with 37 C.F.R. § 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information as defined in 37 C.F.R. § 1.56(a) exists. It is submitted that the Information Disclosure Statement is in compliance with 37 C.F.R. § 1.98 and the Examiner is respectfully requested to consider and cite the listed documents.

While the information and references disclosed in this Information Disclosure Statement may be “material” pursuant to 37 CFR 1.56, it is not intended to constitute an admission that any patent, publication or other information referred to therein is “prior art” for this invention unless specifically designated as such.

The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 04-1073, under Order No. M4065.0693/P693-A.

Application No.: To be assigned

Docket No.: M4065.0693/P693-A

Dated: September 12, 2003

Respectfully submitted,

By  _____

Thomas J. D'Amico

Registration No.: 28,371

DICKSTEIN SHAPIRO MORIN &
OSHINSKY LLP

2101 L Street NW

Washington, DC 20037-1526

(202) 785-9700

Attorneys for Applicant

APPENDIX A

*Kozicki, U.S. Patent No. 6,487,106 (2002): this patent discloses two embodiments shown in Figs. 2 and 3 which include a barrier layer 250, 350, respectively, formed between the layer of conductive material (such as chalcogenide material) 240, 340, respectively and the electrode 230, 330, respectively. (See col. 5, lns. 12-24; col. 7, lns. 7-17). Fig. 5 discloses a structure 502 including an amorphous silicon diode 570 formed adjacent to electrode 520, and a contact 560 formed adjacent the amorphous silicon diode 570.

Kozicki et al., U.S. Patent Application Publication No. 2002/0190350: this publication discloses in Figs. 5A, 6, 8 and 9 a structure having a substrate 510, 610, 810, 910; an insulating layer 520, 620, 820, 920; a bottom electrode 530, 630, 830, 930; an ion conductor 540, 640, 840, 940; a dielectric layer 550, 650, 850, 950; and a top electrode 560, 660, 860, 960. Fig. 5B discloses a structure having a bottom electrode 530, an ion conductor 540, an amorphous diode 562, and a top electrode 560.

*Moore et al., U.S. Patent Application Publication No. 2003/0001229: this publication discloses in Fig. 8 a memory cell structure comprising a substrate 12, a dielectric layer 14, a first metal layer 16, a second metal layer 18, a metal-doped chalcogenide layer 27, another dielectric layer 17, an insulating layer 30, and an electrode 32. First metal layer 16 may be made from tungsten (paragraph 20) and the second metal layer 18 may be silver (paragraph 21).

*Moore et al., U.S. Patent Application Publication No. 2002/0127886: this publication discloses in Fig. 6 a memory cell structure comprising a substrate 10, an insulating layer 11, a conductive layer 12, a metal layer 31, a glass material layer 51, and an electrode 61. Conductive layer 12 may be made from tungsten (paragraph 17) and the metal layer 31 may be silver (paragraph 19).

Moore et al., U.S. Patent Application Publication No. 2002/0123170: this publication discloses in Fig. 6 a memory cell structure which includes a substrate 10, an insulating layer 11, a conductive material 12, a dielectric layer 13, a metal ion-laced glass material 51, a layer of metal material 41, and an electrode 61.

*Kozicki, U.S. Patent Application Publication No. 2003/0035314: this publication discloses a barrier layer 250, 350 as shown in Figs. 2 and 3 and discussed in paragraphs 35 and 45, respectively, formed between the layer of conductive material (such as chalcogenide material) 240, 340, respectively and the electrode 230, 330, respectively. Fig. 5 discloses a structure 502 including an amorphous silicon diode 570 formed adjacent to electrode 520, and a contact 560 formed adjacent the amorphous silicon diode 570, as discussed in paragraph 59.

*Kozicki, U.S. Patent Application Publication No. 2003/0035315: paragraph 70 on page 7 and Fig. 1 disclose a contact 165 electrically coupled to electrode 120, and which may be formed of tungsten. Paragraph 82 on page 8 and Fig. 4 disclose a structure 400 including an amorphous silicon diode 470 formed adjacent to electrode 420, and a contact 460 formed adjacent the amorphous silicon diode 470. Paragraph 102 on page 11 and Figs. 27-28 disclose a common electrode 2710, ion conductors 2730 and 2735, second electrodes 2720 and 2725, and an insulating layer 2750. The insulating layer 2750 is a dielectric layer "that does not interfere with surface electrodeposit growth, such as silicon oxides, silicon nitrides, and the like."

*U.S. Published Applicant No. 2002/0072188 to Gilton: this document generally discloses a programmable variable resistance memory cell in which at least a variable resistance layer of the cell is formed in an isolated stack in an insulative layer.

* U.S. Published Applicant No. 2002/0123169 to Moore et al.: this document discloses a programmable variable resistance memory cell having a first conductive layer 16 formed in an opening in a first dielectric layer, a second conductive layer 18 formed on the first conductive layer. A layer of a chalcogenide material is formed in an opening in a

second dielectric layer aligned with the opening in the first dielectric layer so that the chalcogenide material is formed on and over the first and second conductive layers, and a third conductive layer 32 is formed over the layer of chalcogenide material. *See* paras. 22, 28 and Fig. 8.

* U.S. Published Applicant No. 2002/0123248 to Moore et al.: this document discloses a programmable variable resistance memory cell having a first conductive layer 16 formed in an opening in a first dielectric layer, a second conductive layer 18 formed on the first conductive layer. A layer of a chalcogenide material is formed in an opening in a second dielectric layer aligned with the opening in the first dielectric layer so that the chalcogenide material is formed on and over the first and second conductive layers, and a third conductive layer 32 is formed over the layer of chalcogenide material. *See* paras. 22, 28 and Fig. 8.

* U.S. Published Applicant No. 2002/0168820 to Kozicki: this document discloses several embodiments of a programmable variable resistance memory cell formed in via. An example of the structure disclosed is illustrated in Fig. 1, which shows a first electrode layer 130, a dielectric layer 150 formed on the electrode layer 130 and having an opening formed therethrough to the electrode layer 130, a chalcogenide layer 140 formed in the opening, a barrier layer 155 formed in the opening on the chalcogenide layer 140, a second electrode layer 120 formed in the opening on the barrier layer 155, and a contact layer 165 formed on the second electrode layer 120.

*U.S. Patent No. 6,117,720 to Harshfield: this document generally discloses a plug-type stacked structure for a programmable variable resistance memory cell.

*U.S. Patent No. 6,236,059 to Wolstenholme et al.: this document generally discloses a stacked structure for a programmable variable resistance memory structure 55 partially formed in a pore 50.

*U.S. Patent No. 6,300,684 to Gonzalez et al: this document discloses a programmable variable resistance memory cell 200 formed inside a pore 140, 215 formed in a substrate. *See, e.g.*, Figs. 14-15, col. 6, ln. 81 – col. 7, ln. 34.

*U.S. Patent No. 6,316,784 to Zahorik et al.: this document generally discloses a programmable variable resistance memory cell formed inside pores formed in a substrate.

*U.S. Patent No. 6,348,365 to Moore et al.: this document discloses a programmable variable resistance memory cell which includes a first electrode 12, a chalcogenide –metal ion layer 51, a metal layer 41 which supplies metal ions of the type in the layer 51, and a second electrode 61. *See* Fig. 6.

*U.S. Patent No. 6,391,688 to Gonzalez et al.: this document is a divisional of U.S. Patent No. 6,300,684 and discloses a programmable variable resistance memory cell 200 formed inside a pore 140, 215 formed in a substrate. *See, e.g.*, Figs. 14-15, col. 6, ln. 81 – col. 7, ln. 34.

*WO 00/48196 to Kozicki et al.: this document discloses several embodiments of a programmable variable resistance memory cell formed in via. An example of the structure disclosed is illustrated in Fig. 2, which shows a first electrode layer 230, a dielectric layer formed on the electrode layer 230 and having an opening formed therethrough to the electrode layer 230, a barrier layer 250 formed in the opening and on the first electrode layer 230, a chalcogenide layer 240 formed in the opening on the barrier layer 250, a second electrode layer 220 formed in the opening on the chalcogenide layer 240, and a contact layer formed on the second electrode layer 220.

*WO 02/21542 to Kozicki: this document is the international equivalent to U.S. Published Application No. 2002/0168820 and discloses several embodiments of a programmable variable resistance memory cell formed in via. An example of the structure disclosed is illustrated in Fig. 1, which shows a first electrode layer 130, a dielectric layer 150 formed on the electrode layer 130 and having an opening formed therethrough to the

electrode layer 130, a chalcogenide layer 140 formed in the opening, a barrier layer 155 formed in the opening on the chalcogenide layer 140, a second electrode layer 120 formed in the opening on the barrier layer 155, and a contact layer 165 formed on the second electrode layer 120.

Abdel-All, et al., Vacuum 59 (2000) 845-853: published in December, this document generally relates to, inter alia, the electrical properties of $\text{Ge}_5\text{As}_{38}\text{Te}_{57}$ as a function of temperature.

*Adler and Moss, J. Vac. Sci. Technol. 9 (1972) 1182-1189: this document generally relates to, inter alia, two types of electrical/material switching – threshold and memory, in amorphous materials; the effects of temperature, pressure, and frequency on switching; and the physics of threshold voltage and memory.

Adler et al., Ref. Mod. Phys. 50 (1978) 209-220: this document generally relates to, inter alia, threshold switching in amorphous alloys, state (“on” and “off”) characteristics, and glass properties.

Affi, et al., Appl. Phys. A 55 (1992) 167-169: this document generally relates to, inter alia, SeGe-Sb glasses.

*Affi, et al., J. Phys. 17 (1986) 335-342: this document generally relates to, inter alia, electrical and thermal conductivity of $\text{Ge}_x\text{Se}_{1-x}$ compositions as a function of temperature. $\text{Ge}_{25}\text{Se}_{75}$ stoichiometry is disclosed.

Alekperova and Gadzhieva, 23 (1987) 137-139: this document generally relates to, inter alia, a characteristic diode state in Ag_2Se compositions upon heating (to 376-400°K).

*Aleksiejunas and Cesnys, Phys. Stat. Sol. (a) 19 (1973) K169-K171: this document generally relates to, inter alia, the subjects of selenium investigation and how Se- Ag_2Se contributes silver ions to a selenium composition.

Angell, Annu. Rev. Phys. Chem. 43 (1992) 693-717: this document generally relates to, inter alia, the presence of ion conductors in solids.

Aniya, Solid State Ionics 136-137 (November 2,2000) 1085-1089: this document generally relates to, inter alia, ion conductor glasses.

Asahara and Izumitani, J. Non-Cryst. Solids 11 (1972) 97-104: this document generally relates to, inter alia, Cu-As-Se glass.

Asokan, et al., Phys. Rev. Lett. 62 (1989) 808-810: this document generally relates to, inter alia, $\text{Ge}_x\text{Se}_{100-x}$ glasses and their transition from semiconductor-like material to metal-like material.

Baranovskii and Cordes, J. Chem. Phys. 111 (1999) 7546-7557: this document generally relates to, inter alia, ionic glasses and conduction (percolation theory).

Belin et al., Sol. St. Ionics 136-137 (November 2,2000) 1025-1029: this document generally relates to, inter alia, conductivity spectra of the glass $0.5\text{Ag}_2\text{S}-0.5\text{GeS}_2$ and the temperature dependency of the conductivity.

Belin, et al., Solid State Ionics 143 (July 2,2001) 445-455: this document generally relates to, inter alia, the electrical properties of $\text{Ag}_7\text{GeSe}_5\text{I}$ – an argyrodite compound.

Benmore and Salmon, Phys. Rev. Lett. 73 (1994) 264-267: this document generally relates to, inter alia, the characteristics of chalcogenide alloys.

Bernede, Thin Solid Films 70 (1980) L1-L4: this document is in the French language and the Applicant has no translation. It is presently understood to generally relate to, inter alia, metal- Ag_2Se -metal sandwich devices.

Bernede, Thin Solid Films 81 (1981) 155-160: this document generally relates to, inter alia, memories of selenium alloys with metal (e.g., Ag) electrodes, where the “on” memory states require constant voltage.

Bernede, Phys. Stat. Sol. (a) 57 (1980) K101-K104: this document generally relates to, inter alia, metal-Ag₂Se-P systems.

Bernede and Abachi, Thin Solid Films 131 (1985) L61-L64: this document generally relates to, inter alia, metal-insulator-metal thin films with electroforming effects; the films have silver, gold and copper electrodes.

*Bernede, et al., Thin Solid Films 97 (1982) 165-171: this document generally relates to, inter alia, Ag₂Se/Se/Metal thin film sandwiches, which were studied by shape of electrodes (e.g., symmetrical or asymmetrical).

Bernede, et al., Phys. Stat. Sol. (a) 74 (1982) 217-224: this document generally relates to, inter alia, switching in Al-Al₂O₃Ag_{2-x}Se_{1+x} devices.

Bondarev and Pikhitsa, Solid State Ionics 70/71 (1994) 72-76: this document generally relates to, inter alia, Ag⁽⁺⁾/RbAg₄I₅ boundary – depletion layer, and dendritic electrodeposition.

*Boolchand, Asian Journal of Physics (2000) 9, 709-72: this document generally relates to, inter alia, Ge_xSe_{1-x} glasses, which have selenium-rich and germanium-rich clusters, and the intrinsically-broken bond characteristics thereof.

*Boolchand and Bresser, Nature 410 (2001) 1070-1073: published April 26, this document generally relates to, inter alia, Ag₂Se as an electrolyte additive to glass, e.g., GeSe₄. Ge₃₀Se₇₀ glass was found not to work well because of Ag₂Se crystallization.

*Boolchand, et al., J. Optoelectronics and Advanced Materials, 3 (September 2001), 703: this document generally relates to, inter alia, a review of Raman tool scattering

of chalcogenide glasses. The floppyness and rigidity is observed. $\text{Ge}_x\text{Se}_{1-x}$ is disclosed, as is a stoichiometry of $\text{Ge}_{25}\text{Se}_{75}$.

Boolchand and Grothaus, Eds. Chadi and Harrison, Proc. Int. Conf. Phys, Semicond., 17th (1985) 833-36: this document generally relates to, inter alia, GeSe and GeS glasses and the importance of a broken chemical order therein.

*Boolchand, et al., Properties and Applications of Amorphous Materials, M.F. Thorpe and Tichy, L. (eds.) Kluwer Academic Publishers, the Netherlands, 2001, pp. 97-132: this document generally relates to, inter alia, the prediction of glass rigidity in $\text{Ge}_x\text{Se}_{1-x}$ glass, e.g., $\text{Ge}_{23}\text{Se}_{77}$.

*Boolchand, et al., Diffusion and Defect Data, Vol. 53-54 (1987) 415-420: this document generally relates to, inter alia, thermal annealing of $\text{Ge}_x\text{Se}_{1-x}$ films.

*Boolchand, et al., Phys. Rev. B 25 (1982) 2975-2978: this document generally relates to, inter alia, the examination of GeSe glass having Sn impurities by Mossbauer spectroscopy. Investigations into glass network topology, which has an intrinsically broken bond backbone, suggesting Ge and Se rich clusters.

Boolchand, et al., Sol. State Comm. 45 (1983) 183-185: this document generally relates to, inter alia, $\text{Ge}_x\text{Se}_{1-x}$ and $\text{Ge}_x\text{S}_{1-x}$ glasses.

*Boolchand and Bresser, Dep. Of ECECS, Univ. Cincinnati 45221-0030: this document generally relates to, inter alia, $\text{Ge}_x\text{Se}_{1-x}$ and the relation of glass transition temperature to Ge concentration in backbone. Although the publication date of this reference is not known to the Applicant, it was revised October 28, 1999 and is believed to be publicly available at the University of Cincinnati, Department of Electrical and Computer Engineering and Computer Science.

Bresser, et al., Phys. Rev. Lett. 56 (1986) 2493-2496: this document generally relates to, inter alia, an investigation of c-GeSe₂ structure.

Bresser, et al., J. de Physique 42 (1981) C4-193-C4-196: this document generally relates to, inter alia, the characteristics of GeSe_2 and GeS_2 glasses.

Bresser, et al., Hyperfine Interactions 27 (1986) 389-392: this document generally relates to, inter alia, germanium selenide glasses doped with tellurium.

Cahen, et al., Science 258 (1992) 271-274: this document generally relates to, inter alia, chalcopyrite CuInSe_2 glasses.

Chatterjee, et al., J. Phys. D: Appl. Phys. 27 (1994) 2624-2627: this document generally relates to, inter alia, $\text{As}_x\text{Te}_{100-x-y}\text{Se}_y$ glasses and the current, voltage, and electrical switching behavior. Discloses applicability in read mostly memories.

*Chen and Tai, Appl. Phys. Lett. 37 (1980) 1075-1077: this document generally relates to, inter alia, silver photodoping of $\text{Ge}_x\text{Se}_{1-x}$ and whisker formation (crystalline Ag_2Se).

Chen and Cheng, J. Am. Ceram. Soc. 82 (1999) 2934-2936: this document generally relates to, inter alia, germanium containing chalcogenides doped with Si_3N_4 .

Chen, et al., J. Non-Cryst. Solids 220 (1997) 249-253: this document generally relates to, inter alia, $\text{As}_{10}\text{Ge}_{30}\text{Se}_{60}$ glasses (and the like) doped with Si_3N_4 .

Cohen, et al., J. Non-Cryst. Solids 8-10 (1972) 885-891: this document generally relates to, inter alia, Ge-Te-X glasses as memory devices.

Croitoru, et al., J. Non-Cryst. Solids 8-10 (1972) 781-786: this document generally relates to, inter alia, the physics of conductivity in Ge-containing films.

Dalven and Gill, J. Appl. Phys. 38 (1967) 753-756: this document generally relates to, inter alia, beta- Ag_2Te .

Davis, Search 1 (1970) 152-155: this document generally relates to, inter alia, the subject of amorphous semiconductors as compared to glass.

*Dearnaley, et al., Rep. Prog. Phys. 33 (1970) 1129-1191: this document generally relates to, inter alia, background information about glass and memory.

*Dejus, et al., J. Non-Cryst. Solids 143 (1992) 162-180: this document generally relates to, inter alia, Ag-Ge-Se glass with Ag primarily bonded to Se. The reference discloses glass preparation.

den Boer, Appl. Phys. Lett. 40 (1982) 812-813: this document generally relates to, inter alia, a-Si:H sandwich structures and threshold switching from a low to high conductance.

Drusedau, et al., J. Non-Cryst. Solids 198-200 (1996) 829-832: this document generally relates to, inter alia, work with a-Si:H multilayers optoelectrical properties.

El Bouchairi, et al., Thin Solid Films 110 (1983) 107-113: this document generally relates to, inter alia, $\text{Ag}_{2-x}\text{Se}_{1+x}$ thin film electrical characteristics and metal-like conduction.

El Gharras, et al., J. Non-Cryst. Solids 155 (1993) 171-179: this document generally relates to, inter alia, photoconductivity of amorphous Se and Ge-Se alloy evaporated films, and reduction of photocurrent by increase of Ge content.

*El Ghrandi, et al., Thin Solid Films 218 (1992) 259-273: this document generally relates to, inter alia, GeSe films deposited by PECVD, Ag evaporation deposition onto glass and photodissolution into same, and optical properties are investigated. GeSe stoichiometries of 30/70 and 25/75, respectively, are disclosed.

*El Ghrandi, et al., Phys. Stat. Sol. (a) 123 (1991) 451-460: this document generally relates to, inter alia, dissolution of Ag into $\text{GeSe}_{5.5}$ glass by flash evaporation.

El-kady, Indian J. Phys. 70 A (1996) 507-516: this document generally relates to, inter alia, $\text{Ge}_{21}\text{Se}_{17}\text{Te}_{62}$ glass and memory, switching, and current controlled negative resistance.

Elliott, J. Non-Cryst. Solids 130 (1991) 85-97: this document generally relates to, inter alia, mechanisms of photodissolution of metals (e.g., Ag) in chalcogenides based on ionic and electronic charge carriers.

*Elliott, J. Non-Cryst. Sol. 130 (1991) 1031-1034: this document generally relates to, inter alia, the photodissolution of metals (e.g., Ag) in chalcogenide glasses and the physics thereof.

Elsamanoudy, et al., Vacuum 46 (1995) 701-707: this document generally relates to, inter alia, studies of quaternary chalcogenide films with Te-As-Ge-Si sandwich structures between electrodes.

*El-Zahed and El-Korashy, Thin Solid Films 376 (November 1,2000) 236-240: this document generally relates to, inter alia, $\text{Ge}_{20}\text{Bi}_x\text{Se}_{80-x}$ film analysis regarding conduction and changes from p to n type.

Fadel, Vacuum 44 (1993) 851-855: this document generally relates to, inter alia, a study of the switching and memory characteristics of $\text{Se}_{75}\text{Ge}_{25-x}\text{As}_x$ films.

*Fadel and El-Shair, Vacuum 43 (1992) 253-257: this document generally relates to, inter alia, $\text{Se}_{75}\text{Ge}_7\text{Sb}_{18}$ glass electrical conduction and thermal character.

Feng, et al., Phys. Rev. Lett. 78 (1997) 4422-4425: this document generally relates to, inter alia, germanium selenide and germanium sulfide materials.

*Feng, et al., J. Non-Cryst. Solids 222 (1997) 137-143: this document generally relates to, inter alia, the structural character of $\text{Ge}_x\text{S}_{1-x}$ glass, e.g., hardness and elasticity.

*Fischer-Colbrie, et al., Phys. Rev. B 38 (1988) 12388-12403: this document generally relates to, inter alia, photodiffused Ag-GeSe₂ and the interaction between doped Ag with Se atoms and Ge with Ge atoms.

Fleury, et al., Phys. Stat. Sol. (a) 64 (1981) 311-316: this document generally relates to, inter alia, amorphous selenium films and their conductance.

Fritzsche, J. Non-Cryst. Sol. 6 (1971) 49-71: this document generally relates to, inter alia, background information on chalcogenides as semiconductors.

Fritzsche, Annual Review of Mat. Sci. 2 (1972) 697-744: this document generally relates to, inter alia, background information on amorphous semiconductors.

Gates, et al., J. Am. Chem. Soc. (2001): this document generally relates to, inter alia, creating Ag₂Se nanowires by chemical reaction.

Gosain, et al., Jap. J. Appl. Phys. 28 (1989) 1013-1018: this document generally relates to, inter alia, germanium telluride glasses sandwiched in electrodes and the physics thereof.

*Guin et al., J. Non-Cryst. Sol. 298 (March 28,2002) 260-269: this document generally relates to, inter alia, germanium selenide (GeSe) glass with low hardness, the mechanical properties of which are investigated. Stoichiometries of the glass are disclosed as being, inter alia, 10/90, 20/80, and 30/70, respectively.

*Guin et al., J. Am. Ceram. Soc. 85 (June 2002) 1545-1552: this document generally relates to, inter alia, germanium selenide glasses and a study of the hardness properties thereof. Glass stoichiometries of 40/60 and 20/80, respectively, are disclosed.

Gupta, J. Non-Cryst. Sol. 3 (1970) 148-154: this document generally relates to, inter alia, switching in chalcogenides.

Haberland and Stiegler, J. Non-Cryst. Solids 8-10 (1972) 408-414: this document generally relates to, inter alia, glasses containing Te, As, Ge, and Si, and pulse sequence and time factors in switching.

Haifz, et al., J. Apply. Phys. 54 (1983) 1950-1954: this document generally relates to, inter alia, As-Se-Cu glasses.

Hajto, et al., Int. J. Electronics 73 (1992) 911-913: this document generally relates to, inter alia, metal/a-Si:H/metal devices.

Hajto, et al., J. Non-Cryst. Solids 266-269 (May 1,2000) 1058-1061: this document generally relates to, inter alia, a-Si:H ion conductors, polarity-dependant digital and analogue memory, and dependency on contact metals.

Hajto, et al., J. Non-Cryst. Solids 198-200 (1996) 825-828: this document generally relates to, inter alia, electroformed V/a-Si:H/Cr devices.

Hajto, et al., Phil. Mag. B 63 (1991) 349-369: this document generally relates to, inter alia, p+ type amorphous Si memory structures with polarity dependent analogue switching.

Hayashi, et al., Japan. J. Appl. Phys. 13 (1974) 1163-1164: this document generally relates to, inter alia, Au-CdS(CdSe)-Au systems and metal-Se-Sn-SnO₂ systems.

*Hegab, et al., Vacuum 45 (1994) 459-462: this document generally relates to, inter alia, Ge₂₀M₇₅Sb₁₈ glass electrical conduction and thermal character.

Hirose and Hirose, J. Appl. Phys. 47 (1976) 2767-2772: this document generally relates to, inter alia, Ag photodoped As₂S₃, polarized switching, and dendrite formation.

Hong and Speyer, J. Non-Cryst. Solids 116 (1990) 191-200: this document generally relates to, inter alia, Cd-Ge-As glass with Ag contacts.

Hosokawa, J. Optoelectronics and Advanced Materials 3 (2001) 199-214: this document generally relates to, inter alia, x-ray scattering experiments on glassy $\text{Ge}_x\text{Se}_{1-x}$.

Hu, et al., J. Non-Cryst. Solids 227-230 (1998) 1187-1191: this document generally relates to, inter alia, a-Si:H with Cr and V electrodes.

Hu, et al., Phil. Mag. B. 74 (1996) 37-50: this document generally relates to, inter alia, a-Si:H glasses doped with Cr and analogue memory.

Hu, et al., Phil. Mag. B 80 (January 1, 2000) 29-43: this document generally relates to, inter alia, a-Si:H films doped with Cr-p+.

Iizima, et al., Solid State Comm. 8 (1970) 153-155: this document generally relates to, inter alia, switching and memory effects in As-Te-I^{1,2} and As-Te-Ge-Si³ glass systems. Thermal breakdown is proposed switching effect.

Ishikawa and Kikuchi, J. Non-Cryst. Solids 35 & 36 (1980) 1061-1066: this document generally relates to, inter alia, Ge_2S_2 films with Ag photodissolved therein.

*Iyetomi, et al., J. Non-Cryst. Solids 262 (February 2000) 135-142: this document generally relates to, inter alia, Ag/Ge/Se glasses as a composite of GeSe_2 and Ag_2Se (a fast ion conductor) and polarizability of Se ions.

Jones and Collins, Thin Solid Films 40 (1977) L15-L18: this document generally relates to, inter alia, switching in Se films and switching back with reverse pulse.

Joullie and Marucchi, Phys. Stat. Sol. (a) 13 (1972) K105-K109: this document generally relates to, inter alia, As_2Se_7 glass.

Joullie and Marucchi, Mat. Res. Bull. 8 (1973) 433-442: this document generally relates to, inter alia, As_2Se_5 film conduction and switching.

Kaplan and Adler, J. Non-Cryst. Solids 8-10 (1972) 538-543: this document generally relates to, inter alia, thermal effects on semiconductor switching.

*Kawaguchi, et al., J. Appl. Phys. 79 (1996) 9096-9104: this document generally relates to, inter alia, Ag-rich chalcogenide glass, $\text{Ge}_3\text{S}_7\text{-Ag}$ and $\text{Ge}_{30}\text{Se}_{70}\text{-Ag}$, max Ag content of 67%, graphs phase diagram, and discloses that Ag works better than Cu.

*Kawaguchi and Masui, Jpn. J. Appl. Phys. 26 (1987) 15-21: this document generally relates to, inter alia, silver photodoping of chalcogenide films, e.g., $\text{Ge}_{30}\text{Se}_{70}$ films.

*Kawasaki, et al., Solid State Ionics 123 (1999) 259-269: this document generally relates to, inter alia, the electrical properties of $\text{Ag}_x(\text{GeSe}_3)_{1-x}$, conductivity EMF measurements, glass composition, X-ray diffraction, T_g and T_c , Ag ion transport, and glass structure.

*Kluge, et al., J. Non-Cryst. Solids 124 (1990) 186-193: this document generally relates to, inter alia, photodiffusion of silver into $\text{Ge}_x\text{Se}_{100-x}$ layers, how this differs from ion beam induced diffusion, $\text{Ge}_{30}\text{Se}_{70}$ stoichiometry, Ag_2Se , and percolation threshold.

*Kolobov, J. Non-Cryst. Solids 198-200 (1996) 728-731: this document generally relates to, inter alia, p-type conductive chalcogenides, materials, and physics thereof.

*Kolobov, J. Non-Cryst. Solids 137-138 (1991) 1027-1030: this document generally relates to, inter alia, doped and undoped glass layers as a p-n junction.

Korkinova and Andreichin, J. Non-Cryst. Solids 194 (1996) 256-259: this document generally relates to, inter alia, polarization of chalcogenide glass as depending on the materials used for electrode contacts.

*Kotkata, et al., Thin Solid Films 240 (1994) 143-146: this document generally relates to, inter alia, GeSe glass switching and film thickness, memory, current filament, chemical and mechanical switching properties, and discloses that heat treatment or aging improves switching.

Lakshminarayan, et al., J. Instn. Electronics & Telecom. Engrs. 27 (1981) 16-19: this document generally relates to, inter alia, tellurium-containing chalcogenide glasses.

Lal and Goyal, Indian Journal of Pure & Appl. Phys. 29 (1991) 303-304: this document generally relates to, inter alia, theory on chalcogenide switching.

*Leimer et al., Phys. Stat. Sol. (a) 29 (1975) K129-K132: this document generally relates to, inter alia, germanium selenide glass polarization behavior, e.g., inductive and capacitive components.

*Leung, et al., Appl. Phys. Lett. 46 (1985) 543-545: this document generally relates to, inter alia, photoinduced diffusion of Ag into $\text{Ge}_x\text{Se}_{1-x}$ and techniques for same.

Matsushita, et al., Jap. J. Appl. Phys. 11 (1972) 1657-1662: this document generally relates to, inter alia, Se-SnO₂ film switching and reversibility.

Matsushita, et al., Jpn. J. Appl. Phys. 11 (1972) 606: this document generally relates to, inter alia, polarized memory effect in Se films.

Mazurier, et al., Journal de Physique IV 2 (1992) C2-185 - C2-188: this document generally relates to, inter alia, Te-based glasses.

Messoussi, et al., Mat. Chem. And Phys. 28 (1991) 253-258: this document generally relates to, inter alia, selenium films and Bi electrodes.

*Mitkova and Boolchand, J. Non-Cryst. Solids 240 (1998) 1-21: this document generally relates to, inter alia, the analysis of Group IV and V chalcogenides.

*Mitkova and Kozicki, J. Non-Cryst. Solids 299-302 (May 14, 2002) 1023-1027: this document generally relates to, inter alia, photodissolution of Ag into Se-rich Ge-Se glasses for use in memory devices. In particular, this reference discloses on page 1024 and Fig. 1 a programmable metallization memory cell formed in via and including a metal electrode layer formed on a substrate, an Ag-containing chalcogenide layer formed on the metal electrode, an Ag layer formed on the chalcogenide layer, and another metal electrode formed on the Ag layer. The information disclosed in this reference was available to and known by the inventors prior to the filing of the application.

*Mitkova, et al., Phys. Rev. Lett. 83 (1999) 3848-3851: this document generally relates to, inter alia, Ag doped chalcogenides, $\text{Ge}_{20}\text{Se}_{80}$ stoichiometry is disclosed, Se rich glasses, Ge rich glasses, stoichiometric glasses, and presence of Ag_2Se .

*Miyatani, J. Phys. Soc. Japan 34 (1973) 423-432: this document generally relates to, inter alia, electrical and ionic properties of solid solutions (e.g., doped glass), polarization, conductivity, Ag_2Se and Cu_2Se .

Miyatani, J. Phys. Soc. Japan 13 (1958) 317: this document generally relates to, inter alia, experiments regarding the electronic conductivity, ionic conductivity, hall constant, thermoelectric power, and Nernst coefficient of Ag_2Se as function of the e.m.f., E, the galvanic cell, or the deviation from stoichiometric composition.

*Miyatani, J. Phys. Soc. Japan 14 (1959) 996-1002: this document generally relates to, inter alia, Ag_2Te and Ag_2Se ion conduction and the chemical potential of silver ions.

Mott, J. Non-Cryst. Sol. 1 (1968) 1-17: this document generally relates to, inter alia, glasses with vanadium or iron.

*Nakayama, et al., Jpn. J. Appl. Phys. 32 (1993) 564-569: this document generally relates to, inter alia, electrically erasable nonvolatile memories in chalcogenide

films of $\text{As}_x\text{Sb}_y\text{Te}_z$, flash evaporative deposition techniques, a high set-voltage compared to read-voltage, V_t creates a “filament,” and refresh-type pulse.

*Nakayama, et al., Jpn. J. Appl. Phys. 39 (November 15, 2000) 6157-6161: this document generally relates to, inter alia, phase transition random access memory (PRAM) made of chalcogenide glass.

*Nang et al., Jap. J. App. Phys. 15 (1976) 849-853: this document generally relates to, inter alia, $\text{Ge}_x\text{Se}_{1-x}$ electrical and optical properties; it also discloses $\text{Ge}_{.80}\text{Se}_{.20}$, $\text{Ge}_{.60}\text{Se}_{.40}$, and $\text{Ge}_{.50}\text{Se}_{.50}$.

Narayanan, et al., Phys. Rev. B 54 (1996) 4413-4415: this document generally relates to, inter alia, chalcogenide glass switching as thermally originated.

*Neale and Aseltine, , IEEE Transactions On Electron Dev. Ed-20 (1973) 195-209: this document generally relates to, inter alia, read mostly memories with chalcogenides (e.g., Ge, Te), also discloses “floating gate,” and material combinations including Ge and Se.

Ovshinsky and Fritzsche, Metallurgical Transactions 2 (1971) 641-645: this document generally relates to, inter alia, reversible changes in amorphous Si, Be, and B using a laser to write and erase.

Ovshinsky, Phys. Rev. Lett. 21 (1968) 1450-1453: this document generally relates to, inter alia, rapid and reversible resistive switching by electric field in amorphous semiconductors.

Owen, et al., IEE Proc. 129 (1982) 51-54: this document generally relates to, inter alia, a-Si:H, gold or aluminum dots and silver paste.

Owen, et al., Phil. Mag. B 52 (1985) 347-362: this document generally relates to, inter alia, photoinduced chalcogenide effects (As_2S_3) both reversible and irreversible.

*Owen, et al., Int. J. Electronics 73 (1992) 897-906: this document generally relates to, inter alia, threshold and memory switching a-Si:H ion conductor, polarity-dependant digital memory, analogue memory, and device operation dependency on metal contacts.

Pearson and Miller, App. Phys. Lett. 14 (1969) 280-282: this document generally relates to, inter alia, glass diodes.

*Pinto and Ramanathan, Appl. Phys. Lett. 19 (1971) 221-223: this document generally relates to, inter alia, electric field inducement of glass switching “filamentary” path.

Popescu, Solid-State Electronics 18 (1975) 671-681: this document generally relates to, inter alia, the physics of chalcogenide switching.

Popescu and Croitoru, J. Non-Cryst. Solids 8-10 (1972) 531-537: this document generally relates to, inter alia, switching behavior and thermal instability in chalcogenide glasses.

Popov, et al., Phys. Stat. Sol. (a) 44 (1977) K71-K73: this document generally relates to, inter alia, investigations into threshold and memory switching effects in amorphous selenium with electrodes of Ca, Ni, Ag, and Al.

*Prakash, et al., J. Phys. D: Appl. Phys. 29 (1996) 2004-2008: this document generally relates to, inter alia, switching of $\text{Ge}_{10}\text{As}_{45}\text{Te}_{45}$ glass, study of threshold voltage concept and switch back to off, suitability for read mostly memory.

Rahman and Sivarama, Mat. Sci. Eng. B12 (1992) 219-222: this document generally relates to, inter alia, chalcogenide glass with no exothermic crystallization reaction above T_g being of a threshold-switching type.

*Ramesh, et al., Appl. Phys. A 69 (1999) 421-425: this document generally relates to, inter alia, electrical switching in GeTe with Ag or Cu and thermal character investigations.

Rose, et al., J. Non-Cryst. Solids 115 (1989) 168-170: this document generally relates to, inter alia, a-Si with Cr or V contacts.

Rose et al., Mat. Res. Soc. Symp. Proc. V258 (1992) 1075-1080: this document generally relates to, inter alia, a-Si:H memory.

Schuoocker and Rieder, J. Non-Cryst. Solids 29 (1978) 397-407: this document generally relates to, inter alia, As-Te-Ge film sandwiches with Molybdenum electrodes.

Sharma and Singh, Proc. Indian Natn. Sci. Acad. 46, A, (1980) 362-368: this document generally relates to, inter alia, evaporated Se films and their electrical conductivity.

*Sharma, Ind. J. Of Pure and Applied Phys. 35 (1997) 424-427: this document generally relates to, inter alia, n-type Ag_2Se and other material stoichiometries. The device conductivity is analyzed, as is the grain size as a factor in device ability to polarize.

Snell, et al., J. Non-Cryst. Solids 137-138 (1991) 1257-1262: this document generally relates to, inter alia, a-Si:H analogue memory by applying voltages of increasing magnitude.

Snell et al., Mat. Res. Soc. Symp. Proc. V 297 (1993) 1017-1021: this document generally relates to, inter alia, a-Si:H analogue memory.

Steventon, J. Phys. D: Appl. Phys. 8 (1975) L120-L122: this document generally relates to, inter alia, switching in chalcogenides, resistively changes, and formation of microfilaments at switch.

Steventon, J. Non-Cryst. Solids 21 (1976) 319-329: this document generally relates to, inter alia, chalcogenide switching with pulses and multiple pulse resetting.

Stocker, App. Phys. Lett. 15 (1969) 55-57: this document generally relates to, inter alia, switching character of bulk and thin film glasses.

Tanaka, Mod. Phys. Lett. B 4 (1990) 1373-1377: this document generally relates to, inter alia, photodoping mechanism and Ag/As₃₀Se₇₀.

Tanaka, et al., Solid State Comm. 8 (1970) 387-389: this document generally relates to, inter alia, thermal effect on switching in chalcogenides and As-Te-(Ge or Si).

*Thornburg, J. Elect. Mat. 2 (1973) 3-15: this document generally relates to, inter alia, division of chalcogenides into stoichiometric compounds with no changes upon crystallization, stoichiometric compounds with changes upon crystallization, and non-stoichiometric which phase separate on crystallization, As₂Se, and filament growth as a function of bias applied.

Thornburg, J. Non-Cryst. Solids 11 (1972) 113-120: this document generally relates to, inter alia, As₂Se₃ glass switching sandwich structure.

*Thornburg and White, (1972) 4609-4612: this document generally relates to, inter alia, precipitation of As particles out of As₂Se₃ glass and the alignment in a filament.

*Tichy and Ticha, J. Non-Cryst. Solids 261 (2000) 277-281: published in January, this document generally relates to, inter alia, Ge_xSe_{1-x} glass forming ability and 20/80 respective stoichiometry.

Titus, et al., Phys. Rev. B 48 (1993) 14650-14652: this document generally relates to, inter alia, percolation and chemical thresholds of chalcogenide glass.

*Tranchant, et al., Proceedings of the 6th Riso International Symposium. 9-13 September 1985: this document generally relates to, inter alia, GeSe glass with Ag, silver photodissolution, and generation of Ag₂Se.

Tregouet and Bernede, Thin Solid Films 57 (1979) 49-54: this document generally relates to, inter alia, Ag₂Te glass characteristics.

Uemura, et al., J. Non-Cryst. Solids 117-118 (1990) 219-221: this document generally relates to, inter alia, Ge₄Se₆ raman measurements and glass structure.

*Uttecht, et al., J. Non-Cryst. Solids 2 (1970) 358-370: this document generally relates to, inter alia, As-Te-Ge glass, V_t switching, filament formation, and reversal of voltage causes filament to grown in opposite direction.

Viger, et al., J. Non-Cryst. Solids 33 (1976) 267-272: this document generally relates to, inter alia, Se films dark-conductivity and photoconductivity.

*Vodenicharov, et al., Mat. Chem. and Phys. 21 (1989) 447-454: this document generally relates to, inter alia, M-GeSe-M films investigation for dc conductivity.

Wang, et al., IEEE Electron Dev. Lett. 13 (1992) 471-472: this document generally relates to, inter alia, antifuses.

Weirauch, App. Phys. Lett. 16 (1970) 72-73: this document generally relates to, inter alia, chalcogenide device resistively changes in high electric fields.

*West, et al., J. Electrochem. Soc. 145 (1998) 2971-2974: this document generally relates to, inter alia, Ag/As₂₄S₃₆Ag₄₀/Ag systems and Ag transport.

*West, Ph.D. Dissertation, ASU 1998: this document generally relates to, inter alia, metal dendrite memory with Ag or Cu doped solid electrolyte, photodissolution of Ag into As₂S₃ glass, lateral devices with silver electrodes, vertical devices with Ag electrodes,

write voltages and lesser read voltages, and pinpoint electrode surrounded by ring electrode. In particular, pages 12-18 of this document discusses the fabrication of horizontal and vertical structures for memory cells which incorporate the electrolyte doped memory material. Although the exact publication date for this document is not known, it is believed to be available at Arizona State University.

Zhang, et al., J. Non-Cryst. Solids 151 (1992) 149-154: this document generally relates to, inter alia, T_g investigation for glasses.

*Helbert et al., SPIE Vol. 333 Submicron Lithography (1982): this publication generally relates to, inter alia, hybrid ultragraphic process using both electron beam and conventional optical exposure within the same device level with a photoresist.

*Kozicki et al., Superlattices and Microstructures, 27 (2000): this publication generally relates to, inter alia, solid solutions of metals (e.g., silver) in arsenic trisulfide and their physical and electrical characteristics.

*Kozicki et al., Microelectronic Engineering, vol. 63/1-3 (2002): this publication generally relates to, inter alia, the photodiffusion of Ag into germanium selenide glass films, the amount of Ag that can be incorporated in to such a film by photodiffusion, and the characteristics of the resulting doped films.

*Kozicki et al., Proceedings of the 1999 Symposium on Solid State Ionic Devices (1999): this publication generally relates to, inter alia, physical and electrical characteristics of metal doped chalcogenide films (photodoped $\text{Ag}_4\text{As}_2\text{S}_3$) between electrodes, useful in memories, configurable connections, and self-repairing interconnections.

*Kozicki and Mitkova, Proceedings of the XIX International Congress on Glass, Society for Glass Technology (2001): this publication generally relates to, inter alia, the physical effects of introduction of Ag into chalcogenide glasses, where introduction is by photodiffusion.

*Kozicki, U.S. Patent No. 6,487,106 (2002): this patent discloses two embodiments shown in Figs. 2 and 3 which include a barrier layer 250, 350, respectively, formed between the layer of conductive material (such as chalcogenide material) 240, 340, respectively and the electrode 230, 330, respectively. (See col. 5, lns. 12-24; col. 7, lns. 7-17). Fig. 5 discloses a structure 502 including an amorphous silicon diode 570 formed adjacent to electrode 520, and a contact 560 formed adjacent the amorphous silicon diode 570.

*Kozicki, U.S. Patent Application Publication No. 2003/0035314: this publication discloses a barrier layer 250, 350 as shown in Figs. 2 and 3 and discussed in paragraphs 35 and 45, respectively, formed between the layer of conductive material (such as chalcogenide material) 240, 340, respectively and the electrode 230, 330, respectively. Fig. 5 discloses a structure 502 including an amorphous silicon diode 570 formed adjacent to electrode 520, and a contact 560 formed adjacent the amorphous silicon diode 570, as discussed in paragraph 59.

*Kozicki, U.S. Patent Application Publication No. 2003/0035315: paragraph 70 on page 7 and Fig. 1 disclose a contact 165 electrically coupled to electrode 120, and which may be formed of tungsten. Paragraph 82 on page 8 and Fig. 4 disclose a structure 400 including an amorphous silicon diode 470 formed adjacent to electrode 420, and a contact 460 formed adjacent the amorphous silicon diode 470. Paragraph 102 on page 11 and Figs. 27-28 disclose a common electrode 2710, ion conductors 2730 and 2735, second electrodes 2720 and 2725, and an insulating layer 2750. The insulating layer 2750 is a dielectric layer "that does not interfere with surface electrodeposit growth, such as silicon oxides, silicon nitrides, and the like."

*Helbert et al., SPIE Vol. 333 Submicron Lithography (1982): this publication generally relates to, inter alia, hybrid ultragraphic process using both electron beam and conventional optical exposure within the same device level with a photoresist.

*Kozicki et al., Superlattices and Microstructures, 27 (2000): this publication generally relates to, inter alia, solid solutions of metals (e.g., silver) in arsenic trisulfide and their physical and electrical characteristics.

*Kozicki et al., Microelectronic Engineering, vol. 63/1-3 (2002): this publication generally relates to, inter alia, the photodiffusion of Ag into germanium selenide glass films, the amount of Ag that can be incorporated in to such a film by photodiffusion, and the characteristics of the resulting doped films.

*Kozicki et al., Proceedings of the 1999 Symposium on Solid State Ionic Devices (1999): this publication generally relates to, inter alia, physical and electrical characteristics of metal doped chalcogenide films (photodoped $\text{Ag}_4\text{As}_2\text{S}_3$) between electrodes, useful in memories, configurable connections, and self-repairing interconnections.

*Kozicki and Mitkova, Proceedings of the XIX International Congress on Glass, Society for Glass Technology (2001): this publication generally relates to, inter alia, the physical effects of introduction of Ag into chalcogenide glasses, where introduction is by photodiffusion.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Complete if Known	
				Application Number	To be assigned
				Filing Date	Currently Herewith
				First Named Inventor	John T. Moore
				Art Unit	2824
				Examiner Name	M. Luhrs
Sheet	1	of	10	Attorney Docket Number	M4065.0693/P693-A

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
	AA	2002/0000666	1/3/2002	Kozicki et al.	
	AB	2002/0168820 App.	11/2002	Kozicki	
	AC	2000/0072188 App	6/2002	Gilton	
	AD	2002/0123169 App	9/2002	Moore et al.	
	AE	2002/0123248 App.	9/2002	Moore et al.	
	AF	2003/0027416 A1	2/2003	Moore et al.	
	AG	2003/0049912 A1	3/2003	Campbell et al.	
	AH	2003/0045054 A1	3/2003	Campbell et al.	
	AI	2003/0045049 A1	3/2003	Campbell et al.	
	AJ	2003/0143782 A1	7/2003	Gilton et al.	
	AK	2003/0050124 A1	3/2003	Kanamaru et al.	
	AL	2003/0107105 A1	6/2003	Kozicki	
	AM	2003/0137869 A1	7/2003	Kozicki	
	AN	3,622,319	11/1971	Sharp	
	AO	3,743,847	7/1973	Boland	
	AP	4,269,935	5/1981	Masters et al.	
	AQ	4,312,938	1/1982	Drexler, et al.	
	AR	4,316,946	1/1982	Masters, et al.	
	AS	4,320,191	3/1982	Yoshikawa et al.	
	AT	4,405,710	9/1983	Balasubramanyam et al.	
	AU	4,419,421	12/1983	Wichelhaus, et al.	
	AV	4,795,657	1/1989	Formigoni et al.	
	AW	4,847,674	7/1989	Sliwa et al.	
	AX	4,499,557	2/1985	Holmberg et al.	
	AY	5,177,567	1/1993	Klersy et al.	
	AZ	5,219,788	6/1993	Abernathey et al.	
	AA1	5,238,862	8/1993	Blalock et al.	
	AB1	5,315,131	5/1994	Kishimoto et al.	
	AC1	5,350,484	9/1994	Gardner et al.	
	AD1	5,360,981	11/1994	Owen et al.	
	AE1	5,500,532	3/19/1996	Kozicki et al.	
	AF1	5,512,328	4/1996	Yoshimura et al.	
	AG1	5,512,773	4/1996	Wolf et al.	
	AH1	5,726,083	3/1998	Takaishi	
	AI1	5,751,012	5/12/1998	Wolstenholme et al.	
	AJ1	5,761,115	6/1998	Kozicki et al.	
	AK1	5,789,277	8/1998	Zahorik et al.	
	AL1	5,841,150	11/1998	Gonzalez et al.	
	AM1	5,846,889	12/1998	Harbison et al.	
	AN1	5,896,312	4/20/1999	Kozicki et al.	
	AO1	5,914,893	6/22/1999	Kozicki et al.	
	AP1	5,920,788	7/1999	Reinberg	
	AQ1	5,998,066	12/1999	Block et al.	
	AR1	6,077,729	6/2000	Harshfield	

[illegible]

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ²
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)				
	BA	56126916	10/19981	Akira et al.		
	BB	WO 02/21542	03/14/2002	Kozicki et al.		
	BC	WO 00/48196	08/17/2000	Kozicki et al.		
	BD	WO 97/48032	12/18/1997	Kozicki et al.		
	BE	WO 99/28914	06/10/1999	Kozicki et al.		

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

¹ Applicant's unique citation designation number (optional). ² See attached Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the application number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449B/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)			Complete if Known		
			Application Number	To be assigned	
			Filing Date	Currently Herewith	
			First Named Inventor	John T. Moore	
			Prior Group Art Unit	2824	
			Prior Examiner Name	M. Luhrs	
Sheet	3	of	10	Attorney Docket Number	M4065.0693/P693-A

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS				
Examiner Initials	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²	
	CA	Abdel-All, A.; Elshafie, A.; Elhawary, M.M., DC electric-field effect in bulk and thin-film Ge ₅ As ₃₈ Te ₅₇ chalcogenide glass, <i>Vacuum</i> 59 (2000) 845-853.		
	CB	Adler, D.; Moss, S.C., Amorphous memories and bistable switches, <i>J. Vac. Sci. Technol.</i> 9 (1972) 1182-1189.		
	CC	Adler, D.; Henisch, H.K.; Mott, S.N., The mechanism of threshold switching in amorphous alloys, <i>Rev. Mod. Phys.</i> 50 (1978) 209-220.		
	CD	Afifi, M.A.; Labib, H.H.; El-Fazary, M.H.; Fadel, M., Electrical and thermal properties of chalcogenide glass system Se ₇₅ Ge ₂₅ -xSb _x , <i>Appl. Phys. A</i> 55 (1992) 167-169.		
	CE	Afifi, M.A.; Labib, H.H.; Fouad, S.S.; El-Shazly, A.A., Electrical & thermal conductivity of the amorphous semiconductor GexSe _{1-x} , <i>Egypt, J. Phys.</i> 17 (1986) 335-342.		
	CF	Alekperova, Sh.M.; Gadzhieva, G.S., Current-Voltage characteristics of Ag ₂ Se single crystal near the phase transition, <i>Inorganic Materials</i> 23 (1987) 137-139.		
	CG	Aleksiejunas, A.; Cesnys, A., Switching phenomenon and memory effect in thin-film heterojunction of polycrystalline selenium-silver selenide, <i>Phys. Stat. Sol. (a)</i> 19 (1973) K169-K171.		
	CH	Angell, C.A., Mobile ions in amorphous solids, <i>Annu. Rev. Phys. Chem.</i> 43 (1992) 693-717.		
	CI	Aniya, M., Average electronegativity, medium-range-order, and ionic conductivity in superionic glasses, <i>Solid state Ionics</i> 136-137 (2000) 1085-1089.		
	CJ	Asahara, Y.; Izumitani, T., Voltage controlled switching in Cu-As-Se compositions, <i>J. Non-Cryst. Solids</i> 11 (1972) 97-104.		
	CK	Asokan, S.; Prasad, M.V.N.; Parthasarathy, G.; Gopal, E.S.R., Mechanical and chemical thresholds in IV-VI chalcogenide glasses, <i>Phys. Rev. Lett.</i> 62 (1989) 808-810		
	CL	Axon Technologies Corporation, TECHNOLOGY DESCRIPTION: <i>Programmable Metalization Cell(PMC)</i> , pp. 1-6 (Pre-May 2000).		
	CM	Baranovskii, S.D.; Cordes, H., On the conduction mechanism in ionic glasses, <i>J. Chem. Phys.</i> 111 (1999) 7546-7557.		
	CN	Belin, R.; Taillades, G.; Pradel, A.; Ribes, M., Ion dynamics in superionic chalcogenide glasses: complete conductivity spectra, <i>Solid state Ionics</i> 136-137 (2000) 1025-1029.		
	CO	Belin, R.; Zerouale, A.; Pradel, A.; Ribes, M., Ion dynamics in the argyrodite compound Ag ₇ GeSe ₅ I: non-Arrhenius behavior and complete conductivity spectra, <i>Solid State Ionics</i> 143 (2001) 445-455.		
	CP	Benmore, C.J.; Salmon, P.S., Structure of fast ion conducting and semiconducting glassy chalcogenide alloys, <i>Phys. Rev. Lett.</i> 73 (1994) 264-267.		
	CQ	Bernede, J.C., Influence du metal des electrodes sur les caracteristiques courant-tension des structures M-Ag ₂ Se-M, <i>Thin solid films</i> 70 (1980) L1-L4.		
	CR	Bernede, J.C., Polarized memory switching in MIS thin films, <i>Thin Solid Films</i> 81 (1981) 155-160.		
	CS	Bernede, J.C., Switching and silver movements in Ag ₂ Se thin films, <i>Phys. Stat. Sol. (a)</i> 57 (1980) K101-K104.		
	CT	Bernede, J.C.; Abachi, T., Differential negative resistance in metal/insulator/metal structures with an upper bilayer electrode, <i>Thin solid films</i> 131 (1985) L61-L64.		
	CU	Bernede, J.C.; Conan, A.; Fousenan't, E.; El Bouchairi, B.; Goureaux, G., Polarized memory switching effects in Ag ₂ Se/Se/M thin film sandwiches, <i>Thin solid films</i> 97 (1982) 165-171.		
	CV	Bernede, J.C.; Khelil, A.; Kettaf, M.; Conan, A., Transition from S- to N-type differential negative resistance in Al-Al ₂ O ₃ -Ag ₂ -xSe _{1+x} thin film structures, <i>Phys. Stat. Sol. (a)</i> 74 (1982) 217-224.		
	CW	Bondarev, V.N.; Pikhitsa, P.V., A dendrite model of current instability in RbAg ₄ I ₅ , <i>Solid State</i>		

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449B/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>		Complete if Known			
		Application Number	To be assigned		
		Filing Date	Currently Herewith		
		First Named Inventor	John T. Moore		
		Prior Group Art Unit	2824		
		Prior Examiner Name	M. Luhrs		
Sheet	4	of	10	Attorney Docket Number	M4065.0693/P693-A

		Ionics 70/71 (1994) 72-76.	
CX	Boolchand, P.,	The maximum in glass transition temperature (T _g) near x=1/3 in GexSe1-x Glasses, Asian Journal of Physics (2000) 9, 709-72.	
CY	Boolchand, P.; Bresser, W.J.,	Mobile silver ions and glass formation in solid electrolytes, Nature 410 (2001) 1070-1073.	
CZ	Boolchand, P.; Georgiev, D.G.; Goodman, B.,	Discovery of the Intermediate Phase in Chalcogenide Glasses, J. Optoelectronics and Advanced Materials, 3 (2001), 703	
CA1	Boolchand, P.; Selvanathan, D.; Wang, Y.; Georgiev, D.G.; Bresser, W.J.,	Onset of rigidity in steps in chalcogenide glasses, Properties and Applications of Amorphous Materials, M.F. Thorpe and Tichy, L. (eds.) Kluwer Academic Publishers, the Netherlands, 2001, pp. 97-132.	
CB1	Boolchand, P.; Enzweiler, R.N.; Tenhover, M.,	Structural ordering of evaporated amorphous chalcogenide alloy films: role of thermal annealing, Diffusion and Defect Data Vol. 53-54 (1987) 415-420.	
CC1	Boolchand, P.; Grothaus, J.; Bresser, W.J.; Suranyi, P.,	Structural origin of broken chemical order in a GeSe2 glass, Phys. Rev. B 25 (1982) 2975-2978.	
CD1	Boolchand, P.; Grothaus, J.; Phillips, J.C.,	Broken chemical order and phase separation in GexSe1-x glasses, Solid state comm. 45 (1983) 183-185.	
CE1	Boolchand, P., Bresser, W.J.,	Compositional trends in glass transition temperature (T _g), network connectivity and nanoscale chemical phase separation in chalcogenides, Dept. of ECECS, Univ. Cincinnati (October 28, 1999) 45221-0030.	
CF1	Boolchand, P.; Grothaus, J.,	Molecular Structure of Melt-Quenched GeSe2 and GeS2 glasses compared, Proc. Int. Conf. Phys. Semicond. (Eds. Chadi and Harrison) 17 th (1985) 833-36.	
CG1	Bresser, W.; Boolchand, P.; Suranyi, P.,	Rigidity percolation and molecular clustering in network glasses, Phys. Rev. Lett. 56 (1986) 2493-2496.	
CH1	Bresser, W.J.; Boolchand, P.; Suranyi, P.; de Neufville, J.P.,	Intrinsically broken chalcogen chemical order in stoichiometric glasses, Journal de Physique 42 (1981) C4-193-C4-196.	
CI1	Bresser, W.J.; Boolchand, P.; Suranyi, P.; Hernandez, J.G.,	Molecular phase separation and cluster size in GeSe2 glass, Hyperfine Interactions 27 (1986) 389-392.	
CJ1	Cahen, D.; Gilet, J.-M.; Schmitz, C.; Chernyak, L.; Gartsman, K.; Jakubowicz, A.,	Room-Temperature, electric field induced creation of stable devices in CuInSe2 Crystals, Science 258 (1992) 271-274.	
CK1	Chatterjee, R.; Asokan, S.; Titus, S.S.K.,	Current-controlled negative-resistance behavior and memory switching in bulk As-Te-Se glasses, J. Phys. D: Appl. Phys. 27 (1994) 2624-2627.	
CL1	Chen, C.H.; Tai, K.L.,	Whisker growth induced by Ag photodoping in glassy GexSe1-x films, Appl. Phys. Lett. 37 (1980) 1075-1077.	
CM1	Chen, G.; Cheng, J.,	Role of nitrogen in the crystallization of silicon nitride-doped chalcogenide glasses, J. Am. Ceram. Soc. 82 (1999) 2934-2936.	
CN1	Chen, G.; Cheng, J.; Chen, W.,	Effect of Si3N4 on chemical durability of chalcogenide glass, J. Non-Cryst. Solids 220 (1997) 249-253.	
CO1	Cohen, M.H.; Neale, R.G.; Paskin, A.,	A model for an amorphous semiconductor memory device, J. Non-Cryst. Solids 8-10 (1972) 885-891.	
CP1	Croitoru, N.; Lazarescu, M.; Popescu, C.; Telnic, M.; and Vescan, L.,	Ohmic and non-ohmic conduction in some amorphous semiconductors, J. Non-Cryst. Solids 8-10 (1972) 781-786.	
CQ1	Dalven, R.; Gill, R.,	Electrical properties of beta-Ag2Te and beta-Ag2Se from 4.2 to 300K, J. Appl. Phys. 38 (1967) 753-756.	
CR1	Das et al.,	Theory of the characteristic curves of the silver chalcogenide glass inorganic photoresists, 54 Appl. Phys. Lett., No. 18, pp. 1745-1747 (May 1989).	
CS1	Davis, E.A.,	Semiconductors without form, Search 1 (1970) 152-155.	
CT1	Dearnaley, G.; Stoneham, A.M.; Morgan, D.V.,	Electrical phenomena in amorphous oxide films, Rep. Prog. Phys. 33 (1970) 1129-1191.	
CU1	Dejus, R.J.; Susman, S.; Volin, K.J.; Montague, D.G.; Price, D.L.,	Structure of Vitreous Ag-Ge-Se, J. Non-Cryst. Solids 143 (1992) 162-180.	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449B/PTO			Complete if Known		
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)			Application Number	To be assigned	
			Filing Date	Currently Herewith	
			First Named Inventor	John T. Moore	
			Prior Group Art Unit	2824	
			Prior Examiner Name	M. Luhrs	
Sheet	5	of	10	Attorney Docket Number	M4065.0693/P693-A

CV1	den Boer, W., Threshold switching in hydrogenated amorphous silicon, Appl. Phys. Lett. 40 (1982) 812-813.	
CW1	Drusedau, T.P.; Panckow, A.N.; Klabunde, F., The hydrogenated amorphous silicon/nanodisperse metal (SIMAL) system-Films of unique electronic properties, J. Non-Cryst. Solids 198-200 (1996) 829-832.	
CX1	El Bouchairi, B.; Bernede, J.C.; Burgaud, P., Properties of Ag ₂ -xSe _{1+x} /n-Si diodes, Thin Solid Films 110 (1983) 107-113.	
CY1	El Gharas, Z.; Bourahla, A.; Vautier, C., Role of photoinduced defects in amorphous Ge _x Se _{1-x} photoconductivity, J. Non-Cryst. Solids 155 (1993) 171-179.	
CZ1	El Ghrandi, R.; Calas, J.; Galibert, G.; Averous, M., Silver photodissolution in amorphous chalcogenide thin films, Thin Solid Films 218 (1992) 259-273.	
CA2	El Ghrandi, R.; Calas, J.; Galibert, G., Ag dissolution kinetics in amorphous GeSe _{5.5} thin films from "in-situ" resistance measurements vs time, Phys. Stat. Sol. (a) 123 (1991) 451-460.	
CB2	El-kady, Y.L., The threshold switching in semiconducting glass Ge ₂₁ Se ₁₇ Te ₆₂ , Indian J. Phys. 70A (1996) 507-516.	
CC2	Elliott, S.R., A unified mechanism for metal photodissolution in amorphous chalcogenide materials, J. Non-Cryst. Solids 130 (1991) 85-97.	
CD2	Elliott, S.R., Photodissolution of metals in chalcogenide glasses: A unified mechanism, J. Non-Cryst. Solids 137-138 (1991) 1031-1034.	
CE2	Elsamanoudy, M.M.; Hegab, N.A.; Fadel, M., Conduction mechanism in the pre-switching state of thin films containing Te As Ge Si, Vacuum 46 (1995) 701-707.	
CF2	El-Zahed, H.; El-Korashy, A., Influence of composition on the electrical and optical properties of Ge ₂₀ BixSe _{80-x} films, Thin Solid Films 376 (2000) 236-240.	
CG2	Fadel, M., Switching phenomenon in evaporated Se-Ge-As thin films of amorphous chalcogenide glass, Vacuum 44 (1993) 851-855.	
CH2	Fadel, M.; El-Shair, H.T., Electrical, thermal and optical properties of Se ₇₅ Ge ₇ Sb ₁₈ , Vacuum 43 (1992) 253-257.	
CI2	Feng, X.; Bresser, W.J.; Boolchand, P., Direct evidence for stiffness threshold in Chalcogenide glasses, Phys. Rev. Lett. 78 (1997) 4422-4425.	
CJ2	Feng, X.; Bresser, W.J.; Zhang, M.; Goodman, B.; Boolchand, P., Role of network connectivity on the elastic, plastic and thermal behavior of covalent glasses, J. Non-Cryst. Solids 222 (1997) 137-143.	
CK2	Fischer-Colbrie, A.; Bienenstock, A.; Fuoss, P.H.; Marcus, M.A., Structure and bonding in photodiffused amorphous Ag-GeSe ₂ thin films, Phys. Rev. B 38 (1988) 12388-12403.	
CL2	Fleury, G.; Hamou, A.; Viger, C.; Vautier, C., Conductivity and crystallization of amorphous selenium, Phys. Stat. Sol. (a) 64 (1981) 311-316.	
CM2	Fritzsche, H., Optical and electrical energy gaps in amorphous semiconductors, J. Non-Cryst. Solids 6 (1971) 49-71.	
CN2	Fritzsche, H., Electronic phenomena in amorphous semiconductors, Annual Review of Materials Science 2 (1972) 697-744.	
CO2	Gates, B.; Wu, Y.; Yin, Y.; Yang, P.; Xia, Y., Single-crystalline nanowires of Ag ₂ Se can be synthesized by templating against nanowires of trigonal Se, J. Am. Chem. Soc. (2001) currently ASAP.	
CP2	Gosain, D.P.; Nakamura, M.; Shimizu, T.; Suzuki, M.; Okano, S., Nonvolatile memory based on reversible phase transition phenomena in telluride glasses, Jap. J. Appl. Phys. 28 (1989) 1013-1018.	
CQ2	Guin, J.-P.; Rouxel, T.; Keryvin, V.; Sangleboeuf, J.-C.; Serre, I.; Lucas, J., Indentation creep of Ge-Se chalcogenide glasses below T _g : elastic recovery and non-Newtonian flow, J. Non-Cryst. Solids 298 (2002) 260-269.	
CR2	Guin, J.-P.; Rouxel, T.; Sangleboeuf, J.-C.; Melscoet, I.; Lucas, J., Hardness, toughness, and scratchability of germanium-selenium chalcogenide glasses, J. Am. Ceram. Soc. 85 (2002) 1545-52.	
CS2	Gupta, Y.P., On electrical switching and memory effects in amorphous chalcogenides, J. Non-	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449B/PTO			Complete if Known		
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)			Application Number	To be assigned	
			Filing Date	Currently Herewith	
			First Named Inventor	John T. Moore	
			Prior Group Art Unit	2824	
			Prior Examiner Name	M. Luhrs	
Sheet	6	of	10	Attorney Docket Number	M4065.0693/P693-A

		Cryst. Sol. 3 (1970) 148-154.	
CT2		Haberland, D.R.; Stiegler, H., New experiments on the charge-controlled switching effect in amorphous semiconductors, J. Non-Cryst. Solids 8-10 (1972) 408-414.	
CU2		Haifz, M.M.; Ibrahim, M.M.; Dongol, M.; Hammad, F.H., Effect of composition on the structure and electrical properties of As-Se-Cu glasses, J. Apply. Phys. 54 (1983) 1950-1954.	
CV2		Hajto, J.; Rose, M.J.; Osborne, I.S.; Snell, A.J.; Le Comber, P.G.; Owen, A.E., Quantization effects in metal/a-Si:H/metal devices, Int. J. Electronics 73 (1992) 911-913.	
CW2		Hajto, J.; Hu, J.; Snell, A.J.; Turvey, K.; Rose, M., DC and AC measurements on metal/a-Si:H/metal room temperature quantised resistance devices, J. Non-Cryst. Solids 266-269 (2000) 1058-1061.	
CX2		Hajto, J.; McAuley, B.; Snell, A.J.; Owen, A.E., Theory of room temperature quantized resistance effects in metal-a-Si:H-metal thin film structures, J. Non-Cryst. Solids 198-200 (1996) 825-828.	
CY2		Hajto, J.; Owen, A.E.; Snell, A.J.; Le Comber, P.G.; Rose, M.J., Analogue memory and ballistic electron effects in metal-amorphous silicon structures, Phil. Mag. B 63 (1991) 349-369.	
CZ2		Hayashi, T.; Ono, Y.; Fukaya, M.; Kan, H., Polarized memory switching in amorphous Se film, Japan. J. Appl. Phys. 13 (1974) 1163-1164.	
CA3		Hegab, N.A.; Fadel, M.; Sedeek, K., Memory switching phenomena in thin films of chalcogenide semiconductors, Vacuum 45 (1994) 459-462.	
CB3		Helbert et al., <i>Intralevel hybrid resist process with submicron capability</i> , SPIE Vol. 333 SUBMICRON LITHOGRAPHY, pp. 24-29 (1982).	
CC3		Hilt, DISSERTATION: <i>Materials characterization of Silver Chalcogenide Programmable Metalization Cells</i> , Arizona State University, pp. Title page-114 (UMI Company, May 1999).	
CD3		Hirose et al., <i>High Speed Memory Behavior and Reliability of an Amorphous As₂S₃ Film Doped Ag</i> , PHYS. STAT. SOL. (a) 61, pp. 87-90 (1980).	
CE3		Hirose, Y.; Hirose, H., Polarity-dependent memory switching and behavior of Ag dendrite in Ag-photodoped amorphous As ₂ S ₃ films, J. Appl. Phys. 47 (1976) 2767-2772.	
CF3		Holmquist et al., <i>Reaction and Diffusion in Silver-Arsenic Chalcogenide Glass Systems</i> , 62 J. AMER. CERAM. SOC., No. 3-4, pp. 183-188 (March-April 1979).	
CG3		Hong, K.S.; Speyer, R.F., Switching behavior in II-IV-V ₂ amorphous semiconductor systems, J. Non-Cryst. Solids 116 (1990) 191-200.	
CH3		Hosokawa, S., Atomic and electronic structures of glassy GexSe1-x around the stiffness threshold composition, J. Optoelectronics and Advanced Materials 3 (2001) 199-214.	
CI3		Hu, J.; Snell, A.J.; Hajto, J.; Owen, A.E., Constant current forming in Cr/p+a-/Si:H/V thin film devices, J. Non-Cryst. Solids 227-230 (1998) 1187-1191.	
CJ3		Hu, J.; Hajto, J.; Snell, A.J.; Owen, A.E.; Rose, M.J., Capacitance anomaly near the metal-non-metal transition in Cr-hydrogenated amorphous Si-V thin-film devices, Phil. Mag. B. 74 (1996) 37-50.	
CK3		Hu, J.; Snell, A.J.; Hajto, J.; Owen, A.E., Current-induced instability in Cr-p+a-Si:H-V thin film devices, Phil. Mag. B 80 (2000) 29-43.	
CL3		Huggett et al., <i>Development of silver sensitized germanium selenide photoresist by reactive sputter etching in SF₆</i> , 42 APPL. PHYS. LETT., No. 7, pp. 592-594 (April 1983).	
CM3		Iizima, S.; Sugi, M.; Kikuchi, M.; Tanaka, K., Electrical and thermal properties of semiconducting glasses As-Te-Ge, Solid State Comm. 8 (1970) 153-155.	
CN3		Ishikawa, R.; Kikuchi, M., Photovoltaic study on the photo-enhanced diffusion of Ag in amorphous films of Ge ₂ S ₃ , J. Non-Cryst. Solids 35 & 36 (1980) 1061-1066.	
CO3		Iyetomi, H.; Vashishta, P.; Kalia, R.K., Incipient phase separation in Ag/Ge/Se glasses: clustering of Ag atoms, J. Non-Cryst. Solids 262 (2000) 135-142.	
CP3		Jones, G.; Collins, R.A., Switching properties of thin selenium films under pulsed bias, Thin Solid Films 40 (1977) L15-L18.	
CQ3		Joullie, A.M.; Marucchi, J., On the DC electrical conduction of amorphous As ₂ Se ₇ before	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449B/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	To be assigned
				Filing Date	Currently Herewith
				First Named Inventor	John T. Moore
				Prior Group Art Unit	2824
				Prior Examiner Name	M. Luhrs
Sheet	7	of	10	Attorney Docket Number	M4065.0693/P693-A

		switching, Phys. Stat. Sol. (a) 13 (1972) K105-K109.	
CR3	Joullie, A.M.; Marucchi, J., Electrical properties of the amorphous alloy As ₂ Se ₅ , Mat. Res. Bull. 8 (1973) 433-442.		
CS3	Kaplan, T.; Adler, D., Electrothermal switching in amorphous semiconductors, J. Non-Cryst. Solids 8-10 (1972) 538-543.		
CT3	Kawaguchi et al., Mechanism of photosurface deposition, 164-166 J. NON-CRYST. SOLIDS, pp. 1231-1234 (1993).		
CU3	Kawaguchi, T.; Maruno, S.; Elliott, S.R., Optical, electrical, and structural properties of amorphous Ag-Ge-S and Ag-Ge-Se films and comparison of photoinduced and thermally induced phenomena of both systems, J. Appl. Phys. 79 (1996) 9096-9104.		
CV3	Kawaguchi, T.; Masui, K., Analysis of change in optical transmission spectra resulting from Ag photodoping in chalcogenide film, Japn. J. Appl. Phys. 26 (1987) 15-21.		
CW3	Kawasaki, M.; Kawamura, J.; Nakamura, Y.; Aniya, M., Ionic conductivity of Ag _x (GeSe ₃) _{1-x} (0<x<=0.571) glasses, Solid state Ionics 123 (1999) 259-269.		
CX3	Kluge, G.; Thomas, A.; Klages, R.; Grotzschel, R., Silver photodiffusion in amorphous GeSe _{100-x} , J. Non-Cryst. Solids 124 (1990) 186-193.		
CY3	Kolobov, A.V., On the origin of p-type conductivity in amorphous chalcogenides, J. Non-Cryst. Solids 198-200 (1996) 728-731.		
CZ3	Kolobov, A.V., Lateral diffusion of silver in vitreous chalcogenide films, J. Non-Cryst. Solids 137-138 (1991) 1027-1030.		
CA4	Korkinova, Ts.N.; Andreichin, R.E., Chalcogenide glass polarization and the type of contacts, J. Non-Cryst. Solids 194 (1996) 256-259.		
CB4	Kotkata, M.F.; Afif, M.A.; Labib, H.H.; Hegab, N.A.; Abdel-Aziz, M.M., Memory switching in amorphous GeSeTe chalcogenide semiconductor films, Thin Solid Films 240 (1994) 143-146.		
CC4	Lakshminarayan, K.N.; Srivastava, K.K.; Panwar, O.S.; Dumar, A., Amorphous semiconductor devices: memory and switching mechanism, J. Instn Electronics & Telecom. Engrs 27 (1981) 16-19.		
CD4	Lal, M.; Goyal, N., Chemical bond approach to study the memory and threshold switching chalcogenide glasses, Indian Journal of pure & appl. phys. 29 (1991) 303-304.		
CE4	Leimer, F.; Stotzel, H.; Kottwitz, A., Isothermal electrical polarisation of amorphous GeSe films with blocking Al contacts influenced by Poole-Frenkel conduction, Phys. Stat. Sol. (a) 29 (1975) K129-K132.		
CF4	Leung, W.; Cheung, N.; Neureuther, A.R., Photoinduced diffusion of Ag in GeSe _{1-x} glass, Appl. Phys. Lett. 46 (1985) 543-545.		
CG4	Matsushita, T.; Yamagami, T.; Okuda, M., Polarized memory effect observed on Se-SnO ₂ system, Jap. J. Appl. Phys. 11 (1972) 1657-1662.		
CH4	Matsushita, T.; Yamagami, T.; Okuda, M., Polarized memory effect observed on amorphous selenium thin films, Jpn. J. Appl. Phys. 11 (1972) 606.		
CI4	Mazurier, F.; Levy, M.; Souquet, J.L., Reversible and irreversible electrical switching in TeO ₂ -V ₂ O ₅ based glasses, Journal de Physique IV 2 (1992) C2-185 - C2-188.		
CJ4	McHardy et al., The dissolution of metals in amorphous chalcogenides and the effects of electron and ultraviolet radiation, 20 J. PHYS. C.: SOLID STATE PHYS., pp. 4055-4075 (1987)		
CK4	Messoussi, R.; Bernede, J.C.; Benhida, S.; Abachi, T.; Latef, A., Electrical characterization of M/Se structures (M=Ni, Bi), Mat. Chem. And Phys. 28 (1991) 253-258.		
CL4	Mitkova, M.; Boolchand, P., Microscopic origin of the glass forming tendency in chalcogenides and constraint theory, J. Non-Cryst. Solids 240 (1998) 1-21.		
CM4	Mitkova, M.; Kozicki, M.N., Silver incorporation in Ge-Se glasses used in programmable metallization cell devices, J. Non-Cryst. Solids 299-302 (2002) 1023-1027.		
CN4	Mitkova, M.; Wang, Y.; Boolchand, P., Dual chemical role of Ag as an additive in chalcogenide glasses, Phys. Rev. Lett. 83 (1999) 3848-3851.		
CO4	Miyatani, S.-y., Electronic and ionic conduction in (AgxCu _{1-x}) ₂ Se, J. Phys. Soc. Japan 34 (1973) 423-432.		
CP4	Miyatani, S.-y., Electrical properties of Ag ₂ Se, J. Phys. Soc. Japan 13 (1958) 317.		

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449B/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)			Complete if Known		
			Application Number	To be assigned	
			Filing Date	Currently Herewith	
			First Named Inventor	John T. Moore	
			Prior Group Art Unit	2824	
			Prior Examiner Name	M. Luhrs	
Sheet	8	of	10	Attorney Docket Number	M4065.0693/P693-A

CQ4	Miyatani, S.-y., Ionic conduction in beta-Ag ₂ Te and beta-Ag ₂ Se, Journal Phys. Soc. Japan 14 (1959) 996-1002.
CR4	Mizusaki et al., Kinetic Studies on the Selenization of Silver, 47 Bull. Chem. Soc. Japan, No. 11, pp. 2851-2855 (November 1974).
CS4	Mott, N.F., Conduction in glasses containing transition metal ions, J. Non-Cryst. Solids 1 (1968) 1-17.
CT4	Nakayama, K.; Kitagawa, T.; Ohmura, M.; Suzuki, M., Nonvolatile memory based on phase transitions in chalcogenide thin films, Jpn. J. Appl. Phys. 32 (1993) 564-569.
CU4	Nakayama, K.; Kojima, K.; Hayakawa, F.; Imai, Y.; Kitagawa, A.; Suzuki, M., Submicron nonvolatile memory cell based on reversible phase transition in chalcogenide glasses, Jpn. J. Appl. Phys. 39 (2000) 6157-6161.
CV4	Nang, T.T.; Okuda, M.; Matsushita, T.; Yokota, S.; Suzuki, A., Electrical and optical parameters of GexSe _{1-x} amorphous thin films, Jap. J. App. Phys. 15 (1976) 849-853.
CW4	Narayanan, R.A.; Asokan, S.; Kumar, A., Evidence concerning the effect of topology on electrical switching in chalcogenide network glasses, Phys. Rev. B 54 (1996) 4413-4415.
CX4	Neale, R.G.; Aseltine, J.A., The application of amorphous materials to computer memories, IEEE transactions on electron dev. Ed-20 (1973) 195-209.
CY4	Ovshinsky S.R.; Fritzsche, H., Reversible structural transformations in amorphous semiconductors for memory and logic, Metallurgical transactions 2 (1971) 641-645.
CZ4	Ovshinsky, S.R., Reversible electrical switching phenomena in disordered structures, Phys. Rev. Lett. 21 (1968) 1450-1453.
CA5	Owen, A.E.; LeComber, P.G.; Sarabayrouse, G.; Spear, W.E., New amorphous-silicon electrically programmable nonvolatile switching device, IEE Proc. 129 (1982) 51-54
CB5	Owen, A.E.; Firth, A.P.; Ewen, P.J.S., Photo-induced structural and physico-chemical changes in amorphous chalcogenide semiconductors, Phil. Mag. B 52 (1985) 347-362.
CC5	Owen, A.E.; Le Comber, P.G.; Hajto, J.; Rose, M.J.; Snell, A.J., Switching in amorphous devices, Int. J. Electronics 73 (1992) 897-906.
CD5	Owen et al., Metal-Chalcogenide Photoresists for High Resolution Lithography and Sub-Micron Structures, NANOSTRUCTURE PHYSICS AND FABRICATION, pp. 447-451 (M. Reed ed. 1989).
CE5	Pearson, A.D.; Miller, C.E., Filamentary conduction in semiconducting glass diodes, App. Phys. Lett. 14 (1969) 280-282.
CF5	Pinto, R.; Ramanathan, K.V., Electric field induced memory switching in thin films of the chalcogenide system Ge-As-Se, Appl. Phys. Lett. 19 (1971) 221-223.
CG5	Popescu, C., The effect of local non-uniformities on thermal switching and high field behavior of structures with chalcogenide glasses, Solid-state electronics 18 (1975) 671-681.
CH5	Popescu, C.; Croitoru, N., The contribution of the lateral thermal instability to the switching phenomenon, J. Non-Cryst. Solids 8-10 (1972) 531-537.
CI5	Popov, A.I.; Geller, I.KH.; Shemetova, V.K., Memory and threshold switching effects in amorphous selenium, Phys. Stat. Sol. (a) 44 (1977) K71-K73.
CJ5	Prakash, S.; Asokan, S.; Ghare, D.B., Easily reversible memory switching in Ge-As-Te glasses, J. Phys. D: Appl. Phys. 29 (1996) 2004-2008.
CK5	Rahman, S.; Sivarama Sastry, G., Electronic switching in Ge-Bi-Se-Te glasses, Mat. Sci. and Eng. B12 (1992) 219-222.
CL5	Ramesh, K.; Asokan, S.; Sangunni, K.S.; Gopal, E.S.R., Electrical Switching in germanium telluride glasses doped with Cu and Ag, Appl. Phys. A 69 (1999) 421-425.
CM5	Rose, M.J.; Hajto, J.; LeComber, P.G.; Gage, S.M.; Choi, W.K.; Snell, A.J.; Owen, A.E., Amorphous silicon analogue memory devices, J. Non-Cryst. Solids 115 (1989) 168-170.
CN5	Rose, M.J.; Snell, A.J.; LeComber, P.G.; Hajto, J.; Fitzgerald, A.G.; Owen, A.E., Aspects of non-volatility in a -Si:H memory devices, Mat. Res. Soc. Symp. Proc. V 258, 1992, 1075-1080.
CO5	Safran et al., TEM study of Ag ₂ Se developed by the reaction of poly crystalline silver films and selenium, 317 Thin Solid Films, pp. 72-76 (1998).
CP5	Schuocker, D.; Rieder, G., On the reliability of amorphous chalcogenide switching devices, J.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449B/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	To be assigned
				Filing Date	Currently Herewith
				First Named Inventor	John T. Moore
				Prior Group Art Unit	2824
				Prior Examiner Name	M. Luhrs
Sheet	9	of	10	Attorney Docket Number	M4065.0693/P693-A

		Non-Cryst. Solids 29 (1978) 397-407.	
CQ5	Sharma, A.K.; Singh, B.,	Electrical conductivity measurements of evaporated selenium films in vacuum, Proc. Indian Natn. Sci. Acad. 46, A, (1980) 362-368.	
CR5	Sharma, P.,	Structural, electrical and optical properties of silver selenide films, Ind. J. Of pure and applied phys. 35 (1997) 424-427.	
CS5	Shimizu et al.,	<i>The Photo-Erasable Memory Switching Effect of Ag Photo-Doped Chalcogenide Glasses</i> , 46 B. CHEM SOC. JAPAN, No. 12, pp. 3662-3365 (1973).	
CT5	Snell, A.J.; Lecomber, P.G.; Hajto, J.; Rose, M.J.; Owen, A.E.; Osborne, I.L.,	Analogue memory effects in metal/a-Si:H/metal memory devices, J. Non-Cryst. Solids 137-138 (1991) 1257-1262.	
CU5	Snell, A.J.; Hajto, J.; Rose, M.J.; Osborne, L.S.; Holmes, A.; Owen, A.E.; Gibson, R.A.G.,	Analogue memory effects in metal/a-Si:H/metal thin film structures, Mat. Res. Soc. Symp. Proc. V 297, 1993, 1017-1021.	
CV5	Somogyi et al.,	Temperture Dependence of the Carrier Mobility in Ag ₂ Se Layers Grown on NaCl and SiO _x Substrates, 74 Acta Physica Hungarica, No. 3, pp. 243-255 (1994).	
CW5	Steventon, A.G.,	Microfilaments in amorphous chalcogenide memory devices, J. Phys. D: Appl. Phys. 8 (1975) L120-L122.	
CX5	Steventon, A.G.,	The switching mechanisms in amorphous chalcogenide memory devices, J. Non-Cryst. Solids 21 (1976) 319-329.	
CY5	Stocker, H.J.,	Bulk and thin film switching and memory effects in semiconducting chalcogenide glasses, App. Phys. Lett. 15 (1969) 55-57.	
CZ5	Tai et al.,	Multilevel Ge-Se film based resist systems, SPIE Vol. 333 Submicron Lithography, pp. 32-39 (March 1982).	
CA6	Tai et al.,	Submicron optical lithography using an inorganic resist/polymer bilevel scheme, 17 J. Vac. Sci. Technol., No. 5, pp. 1169-1176 (Sept./Oct. 1980).	
CB6	Tanaka, K.,	Ionic and mixed conductions in Ag photodoping process, Mod. Phys. Lett B 4 (1990) 1373-1377.	
CC6	Tanaka, K.; Iizima, S.; Sugi, M.; Okada, Y.; Kikuchi, M.,	Thermal effects on switching phenomenon in chalcogenide amorphous semiconductors, Solid State Comm. 8 (1970) 387-389.	
CD6	Thornburg, D.D.,	Memory switching in a Type I amorphous chalcogenide, J. Elect. Mat. 2 (1973) 3-15.	
CE6	Thornburg, D.D.,	Memory switching in amorphous arsenic triselenide, J. Non-Cryst. Solids 11 (1972) 113-120.	
CF5	Thornburg, D.D.; White, R.M.,	Electric field enhanced phase separation and memory switching in amorphous arsenic triselenide, Journal(?) (1972) 4609-4612.	
CG5	Tichy, L.; Ticha, H.,	Remark on the glass-forming ability in GexSe1-x and AsxSe1-x systems, J. Non-Cryst. Solids 261 (2000) 277-281.	
CH6	Titus, S.S.K.; Chatterjee, R.; Asokan, S.,	Electrical switching and short-range order in As-Te glasses, Phys. Rev. B 48 (1993) 14650-14652.	
CI6	Tranchant, S.; Peytavin, S.; Ribes, M.; Flank, A.M.; Dexpert, H.; Lagarde, J.P.,	Silver chalcogenide glasses Ag-Ge-Se: Ionic conduction and exafs structural investigation, Transport-structure relations in fast ion and mixed conductors Proceedings of the 6th Riso International symposium. 9-13 September 1985.	
CJ6	Tregouet, Y.; Bernede, J.C.,	Silver movements in Ag ₂ Te thin films: switching and memory effects, Thin Solid Films 57 (1979) 49-54.	
CK6	Uemura, O.; Kameda, Y.; Kokai, S.; Satow, T.,	Thermally induced crystallization of amorphous Ge _{0.4} Se _{0.6} , J. Non-Cryst. Solids 117-118 (1990) 219-221.	
CL6	Uttecht, R.; Stevenson, H.; Sie, C.H.; Griener, J.D.; Raghavan, K.S.,	Electric field induced filament formation in As-Te-Ge glass, J. Non-Cryst. Solids 2 (1970) 358-370.	
CM6	Viger, C.; Lefrancois, G.; Fleury, G.,	Anomalous behaviour of amorphous selenium films, J. Non-Cryst. Solids 33 (1976) 267-272.	
CN6	Vodenicharov, C.; Parvanov, S.; Petkov, P.,	Electrode-limited currents in the thin-film M-GeSe-	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449B/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	To be assigned
				Filing Date	Currently Herewith
				First Named Inventor	John T. Moore
				Prior Group Art Unit	2824
				Prior Examiner Name	M. Luhrs
Sheet	10	of	10	Attorney Docket Number	M4065.0693/P693-A

		M system, Mat. Chem. And Phys. 21 (1989) 447-454.	
	CO6	Wang, S.-J.; Misium, G.R.; Camp, J.C.; Chen, K.-L.; Tigelaar, H.L., High-performance Metal/silicide antifuse, IEEE electron dev. Lett. 13 (1992) 471-472.	
	CP6	Weirauch, D.F., Threshold switching and thermal filaments in amorphous semiconductors, App. Phys. Lett. 16 (1970) 72-73.	
	CQ6	West, W.C.; Sieradzki, K.; Kardynal, B.; Kozicki, M.N., Equivalent circuit modeling of the Ag As _{0.24} S _{0.36} Ag _{0.40} Ag System prepared by photodissolution of Ag, J. Electrochem. Soc. 145 (1998) 2971-2974	
	CT6	West, W.C., Electrically erasable non-volatile memory via electrochemical deposition of multifractal aggregates, Ph.D. Dissertation, ASU 1998	
	CU6	Yoshikawa, et al., A new inorganic electron resist of high contrast, 31 App. Phys. Lett., No. 3, pp. 161-163 (August 1977).	
	CV6	Zhang, M.; Mancini, S.; Bresser, W.; Boolchand, P., Variation of glass transition temperature, T _g , with average coordination number, <m>, in network glasses: evidence of a threshold behavior in the slope dT _g /d<m> at the rigidity percolation threshold (<m>=2.4), J. Non-Cryst. Solids 151 (1992) 149-154.	

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹Applicant's unique citation designation number (optional). ²Applicant is to place a check mark here if English language Translation is attached.